

A modified version of the RICS specification was presented to and adopted by the ISPRS at the Rio Congress in 1984, for a four year trial period. In 1987 a small working group was set up in the UK to review the specification adopted at Rio and to make recommendations for Kyoto, in the light of differences of opinion encountered by users of the aerial photography specifications that have become apparent in recent times.

Both the RICS and the ISPRS specifications contain six sections and although minor differences in the wording occur throughout, differences of substance are found in only four clauses. These four clauses form the basis of the questionnaire.

The Questionnaire

The questionnaire was sent to 70 countries for the attention of the Commission 1 correspondents. Twelve replies were received. A further two questionnaires were received from delegates to the Commonwealth Survey Officers Conference, held at Cambridge University, England August 1987, where delegates were invited to complete questionnaires. Not all respondents answered all questions. The questionnaire was designed to discover the extent to which vertical photography specifications were known and used and in particular, to discover whether users preferred the ISPRS specification, the RICS specification or a compromise on the four clauses where differences of opinion are known to exist.

The results show that 65% of respondents were familiar with the ISPRS specification compared with 43% for the RICS specification. 43% had used the ISPRS specification, but only 14% had used the RICS specification.

In Section 2.1.1. concerning residual distortion of the metric camera calibration, the RICS specification calls for "not more than 15 micrometres within 140 mm of the principal point" whereas the ISPRS offers a choice of three values: 10/15/20 micrometres. 79% favoured the single value suggested by the RICS specification against only 7% for the ISPRS triple option.

In Section 2.2.1. concerning the frequency at which metric camera calibration must be carried out, opinion is more evenly divided with 36% in favour of the one year in RICS and 43% for the two years in ISPRS.

In Section 2.2.3. concerning the intervals for the measurement of radial distortion along the diagonals of the format, RICS calls for "not less than 20 mm", while the ISPRS requires "not less than 25mm". 79% were in favour of the smaller interval with only 14% in favour of the larger ISPRS interval.

In Section 4.2.2. concerning the permissible amount of forward image motion the ISPRS specification is vague and difficult to measure, whereas the RICS offers a simply calculated value. The preference of respondents to this question shows 71% in favour of RICS and 14% for ISPRS.

These results are tabulated in Figure 1.

Results of the Questionnaire
Figure 1

Specification Section	% for RICS	% for ISPRS	Concerning
2.1.1.	79	7	Residual radial distortion
2.2.1.	36	43	Period of validity of metric camera calibration
2.2.3	79	14	Semi-diagonal interval for measurement of radial distortion
4.2.2.	71	14	Permissible forward image motion

All respondents did not answer all questions

DISCUSSION

It is disappointing that a greater number of national correspondents did not return the questionnaire, nevertheless the number of replies received is somewhat above average for this type of postal 'survey'. 57% of those responding indicated that the RICS or the ISPRS specification is used in their countries. Few made any general comments on the specifications in the space provided in the questionnaire, but a few sent accompanying letters. Those who did make general comments on the two specifications thought the differences between them was minimal. However, some strong views were encountered in the case of the four clauses.

Section 2.1.1. Whilst 79% favoured the RICS single value of 15 micrometres the view was advanced by others that a figure of less than 15 micrometres be retained "to discourage the use of older lens types". There is some point to the argument that the three values be retained, with two of them being deleted by agreement between contractor and client, to match the performance of the camera to be used i.e. wide angle, super wide angle or other.

Section 2.2.1. More than half of the respondents thought that 2 years between camera calibrations was sufficient. It is reported that some organisations have now introduced a three year period.

Section 2.2.3.

The radial distortion measurements at intervals not exceeding 20 mm along the diagonals of the format was endorsed by 79% of the respondents but strong opposition was encountered where these measurements are made using fixed collimator rigs as opposed to establishments where goniometers are used. The existing fixed equipment could not make measurements at 20 mm intervals with either wide angle or super wide angle cameras.

Another correspondent thought that measurements at 20 mm intervals was unnecessary, but went on to say that at least six points should be measured on each half diagonal. On many metric cameras where the corner fiducial mark recording obscures a portion of the picture area, only five measurements are possible if a 25 mm interval is used. Some UK test establishments make eleven measurements on each half diagonal. Enquiries at such establishments suggest that important information may be lost when measurements are made as far apart as 25 mm.

Section 4.2.2. There was general agreement that the ISPRS specification is vague in this clause. Where it refers to lens/film resolution, does it mean AWAR or optimum with low or high contrast test object etc. and in any case, many well respected test establishments would not necessarily agree with each other on these measurements. It calls for that which is theoretically possible but not necessarily achieved, even in good commercial practice.

To meet the ISPRS specification the use of a forward motion compensation (FMC) camera magazine would be required in many cases. Whilst this might meet the specification vis-a-vis uncompensated forward image motion, the specification says nothing about degraded image quality that may ensue due to other image motions caused by aircraft roll, pitch or yaw or of angular vibration of the camera. Thus image quality may be degraded, by selecting a slow shutter speed with an FMC magazine (Meier 1984), even though it satisfied the ISPRS specification.

71% favoured the RICS wording for permissible forward image motion while 14% argued for the ISPRS version. Again the argument concerns encouraging the use of the latest equipment. The reality is that many third world countries and indeed, many small organisations in the developed world, do not possess the latest equipment and may not be in a position to afford such equipment for many years to come.

CONCLUSIONS

There is good evidence to show that many are dissatisfied with the ISPRS specification in those areas which have been highlighted in this investigation. Some voting in favour of the status quo admitted that the ISPRS specification was unsatisfactory in some areas. Support for the specification came mainly from academics and government establishments whilst those favouring the RICS version came from the third world and commercial organisations. The exception to this pattern is in Section 2.2.1 where a small majority wanted the 2 year period between metric camera calibrations.

It is therefore concluded, in the light of experience supported by the results of the questionnaire that the wording of Sections 2.1.1, 2.2.3 and 4.2.2 in the RICS specification should replace the wording in the existing ISPRS specification and the existing wording in ISPRS at Section 2.2.1 be retained.

REFERENCES

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